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AUTHOR Wilson, Jack Alexander
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ABSTRACT

A study was conducted to identify those characteristics of vocational education research applications (submitted to the U.S. Office of Education) which are related to judged quality as determined by a panel of raters. Three hundred fifty-three applications were included in the study and each was reviewed by a panel of experts. Twenty-three hypotheses were formulated concerning potential characteristics which might influence ratings of applications. Results of the reviews and data analysis showed statistically significant differences in the ratings of applications which had sixteen particular characteristics as compared to those that did not. When a forward elimination procedure was used to determine the independent contribution of characteristics associated with judged quality, thirteen characteristics emerged, some of which follow: submission of an application by a state department of education, supporting letters of endorsement, enumerated objectives, and number of pages devoted to discussing the approach to be used in achieving project objectives. The study concluded that there is a significant relationship between application characteristics and evaluator ratings, and that certain factors beyond the control of the applicant a priori have major effects. It was recommended that evaluation ratings be standardized, and that detailed guidelines be developed and seminars provided to facilitate preparation of more competitive applications. (BL)

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INVESTIGATION OF CHARACTERISTICS OF VOCATIONAL EDUCATION RESEARCH GRANT APPLICATIONS AND THEIR RELATIONSHIP TO EVALUATOR RATINGS OF QUALITY

by

Jack Alexander Wilson

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Doctor of Philosophy in Education

California Western University

June 1977

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The thesis of Jack Alexander Wilson is approved:

Dr. Donald W. Drewes
Professor, College of Education
North Carolina State University at Raleigh

Dr. V. R. Cardozier
President and Professor of Higher Education and Behavioral Science
University of Texas of the Permian Basin

Dr. Howard F. Hjelm
Acting Associate Commissioner for Adult, Vocational, Technical and Manpower Education
Bureau of Occupational and Adult Education
U.S. Office of Education

Dr. Norman R. Stanger
Professor, School of Applied Arts and Sciences
Director, Center for Career Studies
California State University at Long Beach

Dr. Thomas A. Neal
President
California Western University
Committee Chairman

California Western University

1977

ABSTRACT OF THE DISSERTATION

Investigation of Characteristics of Vocational Education Research Grant Applications and Their Relationship to Evaluator Ratings of Quality

by

Jack Alexander Wilson

Doctor of Philosophy in Education

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1977

This study investigated the attributes of vocational education research applications which were related to a criterion measure of their quality as submitted to the U.S. Office of Education (USOE).

Three hundred and sixty one (361) applications were submitted to USOE for possible support in fiscal year 1975, of which 353 were included in the study. Each application was reviewed by a panel of experts against specific, weighted criteria and then given a numerical score. The total number of points assigned each application by each rater was selected for analysis. The total score ratings were summed across evaluators and the arithmetic mean computed for each

application. The mean rating was treated as the dependent variable. Characteristics of applications were intuitively selected on the basis of empirical definition, mutual exclusivity, conceptual independence from the dependent variables, and apparent variability across applications. These characteristics were used as independent variables and related to the dependent variable.

Twenty-three null hypotheses were developed so that the independent variables bore a one-to-one correspondence with the null hypotheses. Using Statistical Analysis System software on an IBM 370 series computer, the first 22 hypotheses were tested utilizing a one-way analysis of variance design. The analysis of variance was used to test the null hypothesis that average mean total scores did not differ across treatment conditions. For these analyses each independent variable was treated separately and discretely in order to identify those characteristics of applicants that tended to be associated with quality differences as measured by the dependent variable. A multiple linear regression model was used with application characteristics as the independent variables and mean total score assigned to applications as the dependent variable in order to determine the unique contribution of application characteristics to the judged quality of the application.

Statistically significant differences were found in the ratings of applications which had the following charac-

teristics as compared to those that did not: pages numbered, table of contents, abstract, glossary of terms, supporting letters of endorsement, tables and charts, attachments or appendices, enumerated objectives, provision in the budget for consultants, resumes for consultants, resumes of key project staff, project organizational chart, end products of project clearly identified, statement of plan for project evaluation, project director identified by name, and references or sources cited as footnotes. In addition, there was a significant difference in the ratings according to type of institution submitting applications, the priority area addressed by the applicant, and the planned duration of the proposed project effort. There was no significant difference between applications when analyzed by State of origin, Federal region, or the presence in the application of a literature review.

When a forward step-wise elimination procedure was used to determine the independent contribution of characteristics associated with judged quality, the following characteristics were found to make a significant contribution: selection of the guidance priority area, identification of the project director by name, number of pages devoted to the objectives and need statement, addressment of the priority focused on improving administration of vocational education at the local level, submission of an application by a State Department of Education, supporting letters of endorsement, consultants provided for in the budget, enumerated objectives,

submission of an application by a four-year college or university, submission of an application by a non-profit organization, number of pages devoted to discussing the approach to be used in achieving the objectives of the project, presence of an organizational chart in the application, and submission of an application in the priority area focused on the disadvantaged.

The results of the study demonstrate a significant relation between application characteristics and evaluator ratings. The findings suggest that training in the preparation of research applications could improve the judged quality of research applications. The fact that certain factors beyond the control of applicants were found to exert major effects on judgments of quality suggests the necessity for modification of current evaluation procedures.

VITA

Name: Jack Alexander Wilson

Permanent Address: 8511 LaVerne Drive
Adelphi, Maryland 20783

Degree and date to be conferred: Ph.D. June 1977

Date of birth: May 24, 1924

Place of birth: Birmingham, Alabama

Secondary education: Woodlawn High School
Birmingham, Alabama
May 1943

Collegiate institutions attended:

	Dates	Degree	Date of Degree
University of Alabama University, Alabama	02/46 - 06/49	B.S.	June 1949
University of Tennessee Knoxville, Tennessee	09/50 - 06/51	-	-
The American University Washington, D.C.	09/56 - 06/65	M.B.A.	June 1964
California Western University Santa Ana, California	09/75 - 06/77	Ph.D.	June 1977

Major: Research and development in vocational education

Minor: Administration and management

Publications:

"The Bachelors Degree and the Job Market," (Article) The Chi Phi Chakett, The Chi Phi Fraternity, Atlanta, Georgia. April 1977.

Advancing Vocational Education Through Research and Development, U.S. Department of Health, Education and Welfare, Office of Education. Contributor. November 1976.

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Earnings and Supplementary Benefits in Hospitals. (BLS Bulletin Series No. 1210, Number 1 - 16). U.S. Department of Labor, Bureau of Labor Statistics in cooperation with The Women's Bureau. Co-author. 1957.

Measuring Markets: A Guide to the Use of Federal and State Statistical Data. U.S. Department of Commerce, Business and Defense Services Administration. Co-author and major contributor. 1966.

Work Injuries and Work-Injury Rates in Logging Operations, (BLS Report No. 154), U.S. Department of Labor, Bureau of Labor Statistics. February 1960.

Injuries and Accident Causes in the Canning of Fruits and Vegetables (BLS Report No. 183). U.S. Department of Labor, Bureau of Labor Statistics. May 1961.

Experience:

Education Program Specialist
Office of Education
U.S. Department of Health, Education and Welfare
Washington, D.C.
08/67 to present

Lecturer (part-time)
University College
University of Maryland
College Park, Maryland
09/67 - 05/70

Labor Economist
Office of Education
U.S. Department of Health, Education and Welfare
Washington, D.C.
03/65 - 08/67

Industry Economist
Business and Defense Services Administration
U.S. Department of Commerce
Washington, D.C.
10/60 - 03/65

Labor Economist
Bureau of Labor-Management Reports
U.S. Department of Labor
Washington, D.C.
12/59 - 10/60

Labor Economist
Bureau of Labor Statistics
U.S. Department of Labor
Washington, D.C.
05/56 - 12/59

Labor Economist
Bureau of Labor Statistics
U.S. Department of Labor
Atlanta, Georgia
08/54 - 05/56

Supervisory Conference Leader
Carbide and Carbon Chemical Company
Oak Ridge, Tennessee
07/53 - 07/54

Experience (continued)

Statistical Clerk (part-time)
Tennessee Valley Authority
Knoxville, Tennessee
03/53 - 06/53

Labor Economist
Bureau of Labor Statistics
U.S. Department of Labor
Atlanta, Georgia
06/51 - 03/53

Sales Representative
Addressograph-Multigraph Corporation
San Francisco, California
08/49 - 08/50

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Chapter 1

INTRODUCTION

There is considerable variability and range in the quality of vocational education research applications submitted to the U. S. Office of Education for possible support under the authority of the Vocational Education Act of 1963, as amended. This unevenness suggests the need for improving the overall quality of research applications as one means of improving the quality of supported research, while at the same time accommodating a range of applicants who are eligible for such awards. Unfortunately, too little is known about the attributes of a quality application and how it differs from an application judged to be of lesser quality.

The purpose of this study, therefore, is to identify those attributes that are related to a criterion measure of the quality of submitted research applications. Such information could ultimately be used to enhance the overall quality of the Federal Government's vocational education research program.

STATEMENT OF THE PROBLEM

An integral part of American education is the application for and receipt of Federal dollars to improve

the quality of the educational enterprise. In many cases application for and receipt of such funds is simply a matter of "paper shuffling," as in revenue sharing and State block funding. In other cases there is competition either within States or across States for a limited amount of funding. This competition is based on submitted applications which are prepared by applicant institutions.

Certain applicants tend to receive high ratings year after year on the applications they submit with apparent similarity between the format of these applications. Since there is little research to empirically determine what characteristics are associated with rater variations and few documents that even sketch out the techniques of application preparation, it is quite possible that those in greatest need of Federal funding may be denied funds because of lack of knowledge about the characteristics of highly rated grant applications. It is hoped that by empirically identifying the characteristics of highly rated applications that:

1. Federal guidelines for application preparation will become more definitive;
2. Inexperienced grant seekers will be better prepared to compete effectively for funding;
3. Evaluators will become more aware of the application characteristics which may be influencing their ratings.

IMPORTANCE OF THE PROBLEM

In FY 1974, the Office of Education awarded a contract to the National Academy of Sciences, Washington, D. C., to study the Federally-administered research and development program in vocational education. In its report, Assessing Vocational Education Research and Development (Committee on Vocational Education Research and Development, National Research Council, 1976), the Academy concluded that the Office of Education's investment in vocational education research during the period FY 1965 through FY 1974 had had little documented, widespread impact on vocational education throughout the Nation.

Although some explanations were presented in the report for the limited impact which vocational education R&D has had on improving the range and quality of vocational education, the report concludes "...that these deficiencies stem from a lack of coherent policy, administration, and leadership in the vocational R&D program," (p. 2). Further, the report concludes that "...improvement in vocational education R&D requires, first and foremost, stable policy, leadership, and priorities," (p. 2).

Given the thrust of the Academy's findings, it is important that the Office of Education take constructive action to improve the overall effectiveness of its R&D program in vocational education. Ways must be found to target the Federal research dollar on problems in urgent

need of resolution as opposed to problems which have been researched beyond the point of usefulness. Moreover, added attention needs to be given problems of national or multistate significance instead of State or local significance. Newer ways must be found for bringing research findings into the mainstream of daily use and to minimize the lag in the dissemination of such findings. Lastly, attention must be directed toward relevance, i.e., building sufficient rigor and quality into a project so as to assure some measurable impact.

The importance of the Academy's findings became even more important when consideration was given to the fact that during FY 1973, 1974, and 1975 the U.S. Congress appropriated $9 million each year for the U.S. Commissioner of Education to invest in vocational research. Given the sameness of the funding level and the continuing inflation of the dollar, it becomes obvious that less research was purchased for $9 million in FY 1975 than was purchased in FY 1973 when the dollar had greater purchasing power. Should the Congress appropriate the same amount of funds for the Commissioner's discretionary program in vocational R&D during the period ahead, efforts must be taken to assure the added effectiveness of the Federal Government's investment in this phase of educational research.

Through the Education Amendments of 1976 Congress has rewritten Title I of the Vocational Education Act of

1963 as amended so as to give added structure and direction to vocational education research and development (R&D). Unlike the provisions of the previous legislation, the new vocational education amendments of 1976 consolidate the areas of research, exemplary and innovative programs, curriculum development, and staff development into a single category. And, where each of these activities in the past had categorical funding, under the new legislation the U.S. Commissioner of Education will determine allocations for programs of national significance and the states and outlying areas, in their annual and five year program plan, will set forth how Federal funds are to be expended at that level. The reason for the consolidation of vocational education R&D, as stated by the House Committee on Education and Labor, was that "...the separate programs [in the past had] too frequently operated in isolation from one another without any continuity from research to demonstration to implementation," (House Report No. 94-1085, 1976, p. 44). The new legislation mandates a comprehensive and incremental program at both the state and national level for moving validated practices and products into widespread use.

The Education Amendments of 1976 stress program improvement as the single major concern for vocational R&D at the state level. Only those R&D projects are to be supported with Federal funds available to the states which can demonstrate a reasonable probability that the contract will

result in improved teaching techniques or curriculum materials that will be used in a substantial number of classrooms or other learning situations within five years after the termination date of such contract. By this legislated requirement Congress has elected to focus its dollars on applied research instead of basic research so as to enhance, as quickly as possible, the quality of vocational education and program effectiveness.

Moreover, the new legislation places emphasis on those R&D efforts which have a high potential for success. States, for example, are limited to contracts involving (1) applied research and development in vocational education; (2) experimental, developmental, and pilot programs and projects designed to test the effectiveness of research findings, including programs and projects to overcome problems of sex bias and sex stereotyping; (3) improved curriculum materials for presently funded programs in vocational education and new curriculum materials for new and emerging job fields; (4) projects in the development of new careers and occupations, e.g., research and experimental projects to identify new careers; and (5) dissemination of the results of the contracts (Sec. 131(a), Subpart 3, Part A, PL 94-482). Grants or contracts, however, may be used to support programs or projects designed to improve the qualifications of persons serving or preparing to serve in vocational education programs (Sec. 135(a), Subpart 3, Part A, PL 94-482).

Funds authorized for programs of national significance are to be used primarily by the U.S. Commissioner of Education for contracts and only in limited cases may such funds be used for grants. Grants are authorized only in those instances where the applicant can demonstrate a reasonable probability that such a grant will result in improved teaching techniques or curriculum materials. By limiting R&D activities primarily to contracts, the Congress has mandated "...greater precision from the applicants in describing what they want to achieve and greater accountability from them during the time of the contract," (House Report No. 94-1085, 1976, p. 45).

The need for R&D activities is emphasized in virtually every part of the new legislation. Because of the concern which Congress placed on extending and improving vocational education, the Education Amendments of 1976 authorized that 20 percent of the basic state grants be spent on improving vocational education and supportive services. A portion of such funds may be spent on R&D as a means of improving program effectiveness in the classroom or other learning situations.

Thus, the new vocational education amendments of 1976 provide for vocational R&D at both the state and national level. At the state level, program improvement activities are to be an integral part of the state plan whereas at the national level, R&D funds can be used to

support any activity of national significance as authorized under Part B, Subpart 2 of the Amendments (e.g., research, exemplary and innovative programs, curriculum development, vocational education personnel training, overcoming sex bias). In addition, funds are authorized to support a national center for research in vocational education as well as to convert curriculum materials involving job preparation developed by the Armed Forces for use by public and non-profit vocational programs. In order to assure that all vocational research is coordinated within the Office of Education, the National Institute of Education, and the Fund for the Improvement of Postsecondary Education, there has been established a Coordinating Committee on Research in Vocational Education within the Education Division of the Department of Health, Education and Welfare. That Committee is to develop a plan for each fiscal year establishing national priorities for the use of funds available to these agencies for vocational education research, career education research, education and work research, development, exemplary and innovative program projects, and curriculum development projects. It is the expectation of the Congress that through this mechanism, duplication of effort will be avoided.

Thus, if the vocational education research program as currently administered by the Office of Education is to become more responsive to the intent of Congress, the find-

ings of the National Academy of Sciences, and the eroding of the research dollar due to inflation, ways must be found to strengthen the quality of the program, including the procedures by which applications are selected for support. This study has the potential of contributing to the resolution of the above concerns. First, it could provide information on the characteristics of a good application as judged by the raters. This information, if incorporated into the application instructions, has the potential of enhancing the quality of research applications. Moreover, the identification of desirable or undesirable characteristics of an application should be useful information for training researchers. By identifying the factors associated with judged quality of research proposals, the study can contribute to the improvement of vocational education research in particular and educational research in general.

LIMITATIONS OF THE STUDY

This study is limited to vocational education research applications submitted to the Office of Education for possible support during FY 1975. During that year, various types of eligible applicants submitted 361 applications for support. Of these, 352 were given numerical scores by one or more non-Federal Government reviewers and thus qualified for inclusion in the study. The remaining nine (9) applications, although reviewed by non-Federal Government

reviewers, were not assigned a numerical score by the raters and thus were not used in the study.

Moreover, the study was restricted to the ratings provided by a panel of selected reviewers. The ratings assigned to an application by panel members were considered to be final. A different panel was used for each of five different priority areas against which applications were submitted. Thus, one panel reviewed all applications which focused on improving the administration of vocational education at the State level while another panel, for example, focused on all applications targeted on guidance, counseling, placement and follow-up of vocational graduates and dropouts. Within each review panel there was a concerted effort to have at least two of the reviewers be women and at least one represent a minority group. Two of the panel members were content specialists, i.e., they thoroughly understood the subject matter area. The third member of the panel was competent in research design and methodology, while the fourth member was competent in evaluation. The fifth and sixth members of the panel were vocational generalists, including users and consumers of the R&D products.

In addition, panel members were chosen to reflect geographic and employment diversity. Geographic spread was achieved by selection of members throughout the continental United States. Panel members were required to represent a diversity of employers with some members representing col-

leges and universities, while other members represented junior colleges, local or State education agencies or some other type of employer.

The findings of the study are a function of the criteria used in evaluating a given application. Other criteria might have provided a different scoring pattern for the various applications. Different weights for the various criteria may have yielded different score results. These limitations along with constraints regarding the substantive areas an applicant might address provided some restriction to the total study. A field-initiated research program, by contrast, may have generated an entirely different type of application with different factors associated with rater judgments.

Lastly, the implications of this study for improved vocational education research is dependent upon the relation between the quality of the research application and the quality of the final product. No attempt was made in this study to evaluate the quality of the completed research product.

Chapter 2

REVIEW OF THE LITERATURE

A concerted effort has been made to identify salient studies pertaining to the characteristics of vocational education research applications and their relationship to rated quality standards. Because of the scarcity of research references which deal with this problem area, an effort was made to identify that body of literature which related to the problem area, even if in a peripheral way. While the literature review covers approximately fifty years, a more exhaustive study was made of the literature of the past twelve years, the period in which there has been a Federally-sponsored extramural vocational education research program. Among the sources examined were the following:

1. Comprehensive Dissertation Index
   This index identifies over 530,000 doctoral dissertations in all subject areas from 1861 to date. It is searchable by author, university, degree and year, as well as by keywords from the title and from the assigned descriptors.
2. Educational Resources Information Center (ERIC)
   A nationwide system of sixteen clearinghouses specializing in a particular subject area of

education (e.g., career education, higher education, educational management) and responsible for collecting all relevant unpublished, noncopyrighted materials of value in that area. The network has more than 243,000 documents. It is searchable by subject, author, or institution and embraces those materials abstracted and indexed in Resources in Education and Current Index to Journals in Education.

3. National Technical Information Service (NTIS) NTIS is the central source for the public sale of Government-sponsored research, development and engineering reports and other analyses prepared by Federal agencies, their contractors or grantees, or by Special Technology Groups.

Although the literature search provided more than one hundred references on proposals or applications as related to evaluation, review, writing, preparation, submission, and related terms, few references related to the focus of this study.

The most fruitful literature in this area was a study supported by the Division of Research and Demonstration Grants, Social and Rehabilitation Service, U.S. Department of Health, Education, and Welfare entitled Methodological Adequacy of Federal R & D Projects. One of the volumes in the final report focused on a "Synthesis of Literature

Review on Evaluation of Research Quality" (Gupta, 1973). In this work, Gupta carefully examines the literature pertaining to methods of measuring research quality, including the peer review system and peer evaluation. For lack of a coherent and comprehensive definition of such a system or process, the author restricted himself solely to applications of the general concept of peer review.

In a complementary study, Wade (1973) explores this review process from the standpoint of governmental agencies supporting research and describes it as,

> ...a system whereby non-government scientists advise the government how to give away its money...the rationale being that, as a jury of peers, they are the best qualified people to decide whose research is worth supporting and whose is not (p. 158).

Orr (1964) describes a frequently used peer review system in the context of a referee process which may be applied to journals or grants. This method requires the same assumptions rates and prize winning plus the assumption that invisible college membership or other forms of collegiate social circles will not affect how a researcher evaluates his peers.

Sieber (1966) found that in the case of education, or the behavioral sciences, the background of reading committee members was associated with approval rates of grant applications, i.e., the applicants whose background was

similar to that of the readers had a higher percentage of approvals.

Two separate documents published by the Rand Corporation as "Working Notes" (1971) provide still further insight into the review process used in practice oriented research and development management activities in the National Institute of Mental Health (NIMH), the U.S. Department of Agriculture (USDA), and the Office of Economic Opportunity (OEO). According to the Rand documents, the three major review systems are: panel system (single panel, dual panel, running panel), mail review, and "no" review.

In a single panel system, a group is charged with total responsibility for developing and implementing consensual criteria for evaluation (rating). By contrast, the dual panel system has two groups of evaluators. The first group provides evaluations (rating scores) for the second group or panel which makes the final decision. Advantages of the panel system were found to be:

1. reviewers provide their judgments in a face to face meeting,
2. biased opinions are less likely to occur in that exaggerated or unsubstantiated statements can be challenged immediately by other panel members,
3. interactions at a panel meeting tend to be more productive when the panelists are

scientists all doing research in the same problem area but having different points of view.

Disadvantages of the panel system were indicated as:

1. expensive to assemble panel members from throughout the country, i.e., to cover transportation, per diem, and consultant fee. A related disadvantage is the possible influence of the social process in decision making.
2. a panel, lacking in prior experience as a working group, could find itself dominated by one or more panel members with strong personalities or who have highly specialized knowledge about the subject area of the proposal.

The literature on evaluation of the technical quality of research is summarized in recent annotated bibliographies prepared by De Geyndt and Gupta (1976) and Heising and Ford (1976). De Geyndt and Gupta summarize 126 references, classified according to those entries that deal with evaluating the methodological adequacy, those that deal with evaluation and management of research, and those that are U.S. Government documents dealing with evaluation and management of research. Heising and Ford classify references according to those that are of general interest, those that deal with the relevance of research and those that deal with research methodology.

Although there is considerable literature dealing with evaluation of research efforts, no previous work was found that directly pertains to the specific problem to which this study is addressed. In view of this void, the present study would appear to make a significant contribution to furthering the understanding of the review process as used in the Federal Government.

Chapter 3

METHODOLOGY

The purpose of this chapter is to document the procedures utilized in data collection and recording, variable identification and selection, and data analysis. Once again, because of the exploratory nature of this study a departure from tradition is required for the sake of accuracy. In most studies a theoretical framework is developed, variables selected in light of the framework, and data collected and analyzed to shed light on a particular theoretical position.

In this study, the data were already "collected" prior to the identification of the specific variables of interest. This situation is not unique to this study however. Most medical research proceeds initially in this mode. That is, post hoc physical commonalities are identified as potential causes of a disease and preliminary research is begun (e.g., the relationship of smoking and lung cancer). It is such a research model upon which this study's methodology is based. Using an existing data base, it is possible to test inductively appealing hypotheses of relationships between variables. The results of such techniques do not lead to the establishment of causal relationships but rather to the generation of hypotheses which may be further tested by more conclusive research methodologies.

DATA COLLECTION

The Vocational Education Act of 1963, as amended in 1968, authorizes the Office of Education to administer a vocational education research program in keeping with Section 131(a) of Part C of the Act. Half of the funds appropriated by the U.S. Congress for Part C are given directly to the States and outlying areas on a formula basis for their discretionary use in supporting a vocational education research program at the State level. The states' half of the appropriated funds may be used to support up to 75 percent of the cost of Research Coordinating Units and up to 90 percent of the cost of research projects. In fiscal year 1975 the State grant portion of Part C was $9 million with allocations ranging from less than $2,000 in American Samoa and approximately $12,000 in Alaska, to more than $500,000 in such States as California, New York, and Texas.

The portion of the Part C funds reserved for the U. S. Commissioner of Education's discretionary use may be used to make grants and contracts for supporting applied and developmental studies, as well as curriculum development, demonstrations, evaluations, and dissemination projects. In all instances, some cost sharing is required, i.e., the applicant must contribute some funds (the exact amount being unspecified) to the project effort.

Regulations pertaining to the administration of the research program under Part C of the Act are contained in the General Provisions for Programs - Administrative and

Fiscal Requirements - (45 CRF Part 100a) as published in the Federal Register on November 6, 1973 (38 P.R. 30654, 30662). Additional regulations pertaining specifically to the Part C research program are contained in Volume 39, No. 159 of the Federal Register which was published August 15, 1974.

Regulation 100a.26 - Review of Applications (Federal Register, op cit. November 6, 1973) - sets forth basic procedures and criteria to be applied to review of applications received under the vocational education research program, among others. It reads as follows:

> (a) The Commissioner, prior to disposition of applications for grants or contracts, shall have discretion to obtain the review of a panel of experts (except where review by such a panel is required by statute). Any such review will be in addition to the review of an application by the Commissioner in accordance with such procedures as he may establish.
>
> (b) Review by the Commissioner and by the panel of experts will take into account the following factors (in addition to such other criteria as may be prescribed by statute or regulation):
>
> (1) The need for the proposed activity in the area served or to be served by the applicant;
>
> (2) Relevance to priority areas of concern as reflected in provisions contained in the applicable Federal statutes and regulations;
>
> (3) Adequacy of qualifications and experience of personnel designated to carry out the proposed project;
>
> (4) Adequacy of facilities and other resources;

(5) Reasonableness of estimated cost in relation to anticipated results;

(6) Expected potential for utilizing the results of the proposed project with other projects or programs having similar educational purposes;

(7) Sufficiency of size, scope, and duration of the project so as to secure productive results; and

(8) Soundness of the proposed plan of operation, including consideration of the extent to which:

(i) The objectives of the proposed project are sharply defined, clearly stated, capable of being obtained by the proposed procedures, and capable of being measured;

(ii) Provision is made for adequate evaluation of the project and for determining the extent to which the objectives are accomplished;

(iii) Where appropriate, provision is made for satisfactory inservice training connected with project services; and

(iv) Provision is made for disseminating the results of the project and for making materials, techniques, and other outputs resulting therefrom available to the general public and specifically to those concerned with the area of education with which the project is itself concerned. (38 P.R. 30664, Nov. 6, 1973).

Within the above context, the specific criteria which were used to review applications for FY 1975 are as follows:

		Maximum Score
(1)	Priority Area -- Application is focused on an announced priority area(s), and further delineates the priority area.	15
(2)	Need and Problem -- Application clearly defines the need for the project and delineates the problem rather than symptoms of the problem.	15
(3)	Objectives -- The objectives of the proposed project are sharply defined, clearly stated, capable of being attained by the proposed procedures, and capable of being measured.	15
(4)	Plan -- The application clearly describes the general design for the proposed project. The procedures specify in detail how each objective will be accomplished, and an adequate project management plan is available. If appropriate, inservice training, evaluation procedures, and dissemination plans are included.	20
(5)	Results -- The proposed results of end products are identified and described in terms of transportability to other educational projects or programs.	10
(6)	Personnel -- The qualifications and experience of personnel are appropriate for the proposed project.	10
(7)	Institutional Commitment -- The application shows reasonable evidence of commitment to provide adequate facilities and equipment, and the application provides documented assurance of support from cooperating institutions and agencies when necessary for project success.	5

	Maximum Score
(8) Budget -- The estimated cost is reasonable in relation to anticipated results, and the size, scope, and duration of the project are reasonable.	10

Early in 1973, the Deputy Commissioner for Occupational and Adult Education established goals and objectives for the Bureau of Occupational and Adult Education which would be consistent with the broader-based goals for the Office of Education. Along with setting such goals, there were established Bureau-wide planning procedures which included determining the priorities for the vocational education research program for fiscal year 1974. Among the objectives established for the Bureau were the following ones to which the vocational education research program was committed:

1. To improve and extend existing programs and develop new approaches for adult, vocational, and manpower education.

2. To improve and expand the training for individuals having special needs, including the educationally disadvantaged, the unemployed and underemployed, the gifted, and the cultural minorities and to bring about the integration of handicapped students into regular training programs.

3. To improve and extend occupational counseling, guidance, job placement, and follow-up services in elementary, secondary, and postsecondary programs.

4. To improve the State administration of occupational, vocational, adult, and manpower education.

Since the vocational education research program is mission-oriented, it functions to assist the Bureau in accomplishing its overall goals rather than to accomplish independent goals. Thus, within this management context, the research priorities for fiscal year 1975 were selected from a list of multi-program objectives established in support of Bureau goals.

The selected objectives cited above were used in the further planning of the research priorities. Selected groups and associations (e.g., Research Committee of the State Directors of Vocational Education, Research and Evaluation Committee of the National Advisory Council on Vocational Education, American Vocational Association, American Association of Community and Junior Colleges) as well as staffs of the Department of Health, Education and Welfare's Regional Offices and the National Institute of Education were invited to make recommendations on needed research priorities which would be in keeping with the Bureau's objectives. (See Appendix A for the specific research priorities, application submission procedures and guidelines.)

At the time the above priorities were announced in the Federal Register (October 11, 1974), the funding criteria called for applications to be submitted to the Application Control Center, U.S. Office of Education, Washington,

D.C. by November 29, 1974 and listed the approximate amount of funds anticipated for allocation to each State and outlying area under the authority of Section 131(a) of Part C of the Act. This announcement, referenced as "additional criteria," was confirmed by re-publication in the Federal Register on February 28, 1975.

Following the publication in the Federal Register on October 11, 1974, the following procedures were initiated:

1. Identify and select personnel for application review panels
2. Receive and log applications referred to the Research Branch, Division of Research and Demonstration, Bureau of Occupational and Adult Education, by the Office of Education's Application Control Center
3. Conduct panel review of applications for technical merit
4. Recommend and obtain approval of applications for funding
5. Submit approved applications for negotiation of grants
6. Award grants
7. Notify applicants not recommended for funding.

Review panels, composed of Federal and non-Federal technical reviewers, were established to evaluate applications that were officially transmitted and received by the announced deadline for receiving applications within the Office of Education, which was November 29, 1974. A separate review panel was established for each of the five priority areas referenced above.

Members of each panel were selected on the basis of the following criteria:

A. Two of the panel members to be specialists.

B. One of the panel members to be a research, demonstration or curriculum development design specialist.

C. One of the panel members to be an evaluation specialist.

D. One of the panel members to be a generalist, including users and consumers of the R&D products.

The criteria established for the formation of each panel was as follows:

A. Panels to consist of at least five voting members with two of the individuals being Federal employees and three being non-Federal field readers plus the chairperson and the executive secretary.

B. The chairperson to be the branch chief, or designated representative, and will be a non-voting member.

C. The program officer to serve as executive secretary and resource person to the panel and will not be a voting member.

In addition to the above criteria for the formation of each panel and the selection of panel members, the following criteria for the selection of reviewers across all panels were used:

A. Attention to be given to geographical spread.

B. Attention to be given to institutional spread and by type of institution.

C. Attention to be given to not having two panel members from the same institution.

Using the above sets of criteria, the panel members were selected for each of the five panels which separately addressed a priority area. See Appendix B for composition of the panels.

Three hundred and sixty one (361) applications were submitted to the Office of Education for possible support in FY 1975 from five major types of institutions. Table 1 indicates the number of applications submitted by the various types of institutions and the priority areas against which the applications were focused.

All 361 applications were reviewed by program specialists within the Research Branch, Division of Research and Demonstration, Bureau of Occupational and Adult Education to determine if the applicant was eligible for a research grant along with other technical requirements of the program. If an applicant met these provisions of the Act or the rules and regulations which gave interpretation to the Act, the program specialist then reviewed the application and completed a Technical Application Review Form containing the criteria for evaluating applications. Upon completion of this review, a program specialist and the Chief, Research Branch, jointly decided which applications were of sufficient quality to be sent to a full panel for review. This screening process was primarily designed to screen out only the very weakest applications and to keep the number of applications submitted to any one panel to fifty or

Table 1. Applications Received by Type of Institution and Priority Area

Type of Institution	Priority Areas					Totals
	State Admin.	Local Admin.	Guid-ance	Disad-vant.	Curr. Dev.	
Local Education Agency	0	14	31	19	19	83
State Education Agency	26	8	17	6	7	64
College or University	16	15	33	29	21	114
Community College or Technical Institution	1	8	15	10	13	47
Non-Profit Organization	3	2	7	21	7	40
Profit Organization	3	2	2	5	1	13
Totals	49	49	105	90	68	361

less, since experience has shown that fifty applications constituted a maximum panel work load.

Because the Act states that "the Commissioner may not approve an application until such application has been reviewed by a panel of experts who are not employees of the Federal Government," and because Office of Education procedures require that every application be reviewed by a non-Federal reviewer, non-Federal members of the various panels completed technical reviews on each of the "screened-out" applications. If the reviewers concluded that an application in the "screened-out" category warranted further consideration, the application was reviewed by the entire panel.

Each application warranting panel review was sent to only one panel even though an application may have addressed portions of two priority areas. Such situations were rare. When one did occur, the application was assigned to the panel which could best evaluate its primary thrust.

As the applications became available for evaluation, they were mailed to the reviewer's home or office, or, in the case of Office of Education reviewers, delivered to their offices. Upon receipt of an application, the reviewer read the application and then prepared comments on the strengths and weaknesses of the application on a criterion by criterion basis. Numerical scores were then assigned to each criterion in order to arrive at a tentative total score for the application. At the time of the independent evalua-

tion, the reviewer also prepared a one paragraph summary giving an overall assessment of the proposed project.

After the application reviews had been completed by each panel member, the members of each of the five panels met in mid-January 1975 in Washington, D.C. At this meeting, the panel member brought his or her technical reviews and applications. The meetings of the five panels took place concurrently. At each panel meeting the Chairperson:

1. described procedures for discussing, recording comments, and rating applications,

2. stressed the necessity for panel members to withdraw from the meeting and the review and rating of any application in which he or she had a possible conflict of interest,

3. conducted discussion of applications in numerical order, encouraging discussion on the part of each voting panel member to promote the fullest possible perspective on each application,

4. called upon the Executive Secretary to read any comments or recommendations on the individual application received from the applicant's State Department of Education and/or the U.S. Department of Health, Education and Welfare Regional Offices,

5. asked each panel member to indicate a final score for each application along with the salient strengths and weaknesses of the proposed project following a full discussion of the application.

An effort was made to have each panel member rate applications independently, i.e., to give an application a final score which best reflected the strengths and

weaknesses of the application. No concensus on the part of an entire panel was sought. Each panel member was required to do his or her scoring independently of other panel members.

Following the three-day panel meeting, the Chairperson and Executive Secretary of each panel checked each of the reviewer's Application Technical Review Forms and then calculated the average panel score for each application.

Thus, each application was rated in terms of the criteria established and the data base for this study was established. Following the identification and selection of specific variables a recording sheet was developed and data were transferred from the project file to the data sheet to insure confidentiality of the data. See Appendix C for a copy of the data recording form.

INDENTIFICATION AND SELECTION OF VARIABLES

As stated previously, the identification and selection of variables was post hoc. In gist, the dependent variable was evaluator ratings and the independent variables were application characteristics. The total number of points assigned each application by each rater was selected for analysis. In order to increase stability and reliability of the ratings, the total score ratings were summed across evaluators and the arithmetic mean computed for each

application. The mean rating was treated as the dependent variable. Because the mean total score reflected the judgment of the overall quality of the application across evaluators, it should be relatively free of measurement error.

The independent variables were intuitively selected and should in no way be considered to be exhaustive. This is not to say that the variables were not carefully selected but only to point out other variables might have been chosen by other investigators. Four factors were considered in selecting the independent variables - empirical definition, mutual exclusivity, conceptual independence from the dependent variable, and apparent variability across applications.

The final listing of independent variables is as follows:

1. State in which the applicant was located;
2. Office of Education region for the applicant's State;
3. Proposed duration of the project;
4. Type of institution submitting the application;
5. Priority area which the application addressed;
6. Whether the pages of the application were numbered;
7. Whether the application had a table of contents;
8. Whether the application contained an abstract;

9. Whether the application contained a glossary of terms;

10. Whether the application contained supporting letters of endorsement for the proposed project;

11. Whether the application contained a literature review;

12. Whether the application contained tables or charts;

13. Whether the application contained attachments or appendices;

14. Whether the objectives of the proposed study or project were enumerated;

15. Whether the consultants were provided for in the budget;

16. Whether the resumes of proposed consultants were provided for in the application;

17. Whether the resumes of the proposed key staff of the project were provided in the application;

18. Whether the director for the project was identified by name in the application;

19. Whether the application provided an organizational chart for the project;

20. Whether the end-products of the project were clearly identified;

21. Whether a statement of plan for the evaluation of the project was provided for in the application;

22. Whether references or sources were cited as footnotes.

HYPOTHESES

The following null hypotheses are specified. It should be noted that the listing of the independent vari-

ables bears a one-to-one correspondence with the null hypotheses.

1. There is no difference between the mean total scores assigned to applications originating in one state as contrasted to other states.

2. There is no difference between the mean total scores assigned to applications originating in one Office of Education-recognized region as contrasted to other such regions.

3. There is no difference between the mean total scores assigned to applications proposing a short duration of a project as contrasted to those with longer duration.

4. There is no difference between the mean total scores assigned to applications submitted by one type of institution as contrasted to another type.

5. There is no difference between the mean total scores assigned to applications focused on one priority area as contrasted to another area.

6. There is no difference between the mean total scores assigned to applications that have their pages numbered and those that do not.

7. There is no difference between the mean total scores assigned to applications that contain a table of contents and those that do not.

8. There is no difference between the mean total scores assigned to applications that contain an abstract and those that do not.

9. There is no difference between the mean total scores assigned to applications that contain a glossary of terms and those that do not.

10. There is no difference between the mean total scores assigned to applications that contain supporting letters or endorsements and those that do not.

11. There is no difference between the mean total scores assigned to applications containing a literature review and those that do not.

12. There is no difference between the mean total scores assigned to applications containing tables and charts and those that do not.

13. There is no difference between the mean total scores assigned to applications containing attachments and appendices and those that do not.

14. There is no difference between the mean total scores assigned to applications containing enumerated objectives and those that do not.

15. There is no difference between the mean total scores assigned to applications containing a provision for consultants and those that do not.

16. There is no difference between the mean total scores assigned to applications containing resumes of consultants and those that do not.

17. There is no difference between the mean total scores assigned to applications containing resumes of project key staff and those that do not.

18. There is no difference between the mean total scores assigned to applications containing a project organizational chart and those that do not.

19. There is no difference between the mean total scores assigned to applications containing clearly identified end products and those that do not.

20. There is no difference between the mean total scores assigned to applications containing a statement of plan for the evaluation of the project and those that do not.

21. There is no difference between the mean total scores assigned to applications in which the project director is identified by name and those that do not.

22. There is no difference between the mean total scores assigned to applications in which references are cited as footnotes and those that do not.

23. There is no linear relationship between the aforementioned application characteristics and mean total score ratings where application characteristics are simultaneously treated as independent variables.

DATA ANALYSIS

Following the collection and recording of data on a standardized form, the data were keypunched and verified. The Statistical Analysis System (SAS) software was utilized to perform all analyses using an IBM 370 series computer. The SAS program was utilized due to the relatively large number of analyses required and its unique capability to perform elimination procedures to obtain the most parsimonious linear models.

The first 22 hypotheses were tested utilizing a one-way analysis of variance design. The analysis of variance was used to test the null hypothesis that the average mean total score did not differ across treatment conditions. For those analyses each independent variable was treated separately and discretely. This procedure was utilized in order to identify those characteristics of applicants that tended to be associated with quality differences as measured by the dependent variable.

In order to determine the unique contributions of application characteristics to the judged quality of the application, a multiple linear regression model was used with application characteristics as the independent variables and mean total score assigned to applications as the

dependent variable. Because many of applicant characteristics were qualitative variables (presence or absence of a characteristic), dummy variables were used in the regression model. When dummy variables are used, a base class must be selected for each qualitative applicant characteristic. The beta weights are then interpreted as the deviations from the base class. For a discussion of the use of dummy variables in multiple regression models see Johnston (1972).

Chapter 4

RESULTS

In order to simplify presentation of the results of this study, each hypothesis will be treated in order.

The first hypothesis is that there is no difference between the average mean total scores assigned to applications originating in one State as contrasted to other States. This null hypothesis was not rejected at the .05 alpha level. As can be seen in Table 2, of the 54 States and outlying areas which submitted applications for which ratings were available, 10 submitted only one application, 8 submitted 2 applications, 5 submitted 3 applications, and 5 submitted 4 applications. Thus, in only 26 States were there as many as 5 applications or more to consider supporting with the State's allocation of Federal research funds. Although not statistically significant, the average mean total scores ranged from 29.18 in Idaho where there were 7 submissions to 61.90 in Georgia where there were 5 submissions. When all application submissions were examined for purposes of establishing a range in variability, Guam (1 submission) and Idaho (7 submissions) had the lowest overall mean ratings with scores of 29.00 and 29.18 respectively, whereas Wyoming (1 submission) and New Hampshire (1 submission) had the highest overall mean ratings with scores of 75.00 and 75.66

Table 2. Number of Applications and Average Mean Total Score by State

State	Number of Submissions	Average Mean Total Score
Alabama	5	54.74
Alaska	1	55.66
Arizona	6	58.82
Arkansas	2	50.08
California	25	49.58
Colorado	7	47.54
Connecticut	12	31.78
Delaware	3	42.92
Dist. of Columbia	4	48.15
Florida	2	44.30
Georgia	5	61.90
Hawaii	1	64.66
Idaho	7	29.18
Illinois	14	49.88
Indiana	3	51.15
Iowa	5	40.23
Kansas	4	53.14
Kentucky	9	46.02
Louisiana	2	54.66
Maine	1	47.60
Maryland	3	68.11
Massachusetts	6	42.83
Michigan	15	44.86
Minnesota	3	48.63
Mississippi	7	40.14
Missouri	8	52.56
Montana	3	46.22
Nebraska	2	53.41
Nevada	1	43.00
New Hampshire	1	75.66
New Jersey	7	37.51
New Mexico	4	43.32
New York	15	43.99
North Carolina	26	44.52
North Dakota	2	37.76
Ohio	18	57.97

Table 2. Number of Applications and Average Mean Total Score by State (continued)

State	Number of Submissions	Average Mean Total Score
Oklahoma	5	56.41
Oregon	6	42.77
Pennsylvania	27	45.05
Rhode Island	1	39.33
South Carolina	4	40.70
South Dakota	2	34.91
Tennessee	6	53.01
Texas	9	54.05
Utah	1	74.66
Vermont	1	43.80
Virginia	24	52.63
Washington	6	50.00
West Virginia	4	51.79
Wisconsin	12	57.25
Wyoming	1	75.00
American Samoa	0	---
Guam	1	29.00
Puerto Rico	2	56.50
Trust Territory	2	53.95
Virgin Islands	0	---
Total	353	48.19

Significant at 0.5231 level

respectively. Although not statistically significant, the range does reflect considerable variability in the quality of application submissions on a State basis.

The second hypothesis is that there is no difference between the average mean total scores assigned to applications across Federal region. This null hypothesis was not rejected at the .05 alpha level. The average mean total score is presented in Table 3.

Table 3. Number of Applications and Average Mean Total Score by Federal Region

Region	Number of Submissions		Average Mean Total Score
1	22		38.40
2	23		43.36
3	65		49.42
4	65		46.82
5	65		52.32
6	22		52.33
7	19		49.53
8	16		47.90
9	36		51.03
10	20		40.82
	353	Overall Mean	48.19

Significant at 0.1006 level

The third hypothesis is there is no difference between average mean total scores assigned by raters to applications proposing a short duration of a project as contrasted to those with longer duration. This null hypothesis was rejected at the .05 alpha level. Table 4 reflects the varia-

bility in total mean scores for applications proposing a project of one month duration (22.50), as contrasted to applications with a proposed duration of 18 months (50.71).

Table 4. Number of Applications by Proposed Project Duration and Average Mean Total Score

Project Duration	Number of Applications		Average Mean Total Score
1	2		22.50
2	1		50.00
4	1		33.50
6	2		53.91
9	5		46.58
10	4		40.47
11	1		47.00
12	130		44.08
13	1		72.75
14	9		48.08
15	19		59.38
16	2		66.38
17	3		47.08
18	153		50.71
21	3		65.19
24	7		42.26
36	7		53.73
48	3		22.50
	353	Overall Mean	48.19

Significant at 0.0209 level

The fourth hypothesis is there is no difference between average mean total scores assigned by raters to applications submitted by one type of institution as contrasted to another type. This null hypothesis was rejected at the .05 alpha level. As shown in Table 5, the range in variability of the overall mean scores varied from 30.66 for post sec-

ondary institutions which were not junior or community colleges to 56.26 for profit organizations. The trend seems apparent that the institution delivering services directly is rated lower than the more research oriented organization.

Table 5. Number of Applications by Type of Institution Submitting Applications and Average Mean Total Score

Type of Institution	Number of Applications		Average Mean Total Score
Local Education Agency	70		36.29
State Education Agency	64		52.72
Junior or Community College	45		42.76
College or University (4 year)	110		52.60
Profit Organization	15		56.26
Non-Profit Organization	46		53.26
Post Secondary, Non-Junior, or Community College	3		30.66
	353	Overall Mean	48.19

Significant at 0.0001 level

The fifth hypothesis is that there is no difference between average mean total scores assigned to applications focused on one priority area as contrasted to another area. This null hypothesis was rejected at the .05 alpha level.

Applications which focused on priority relating to guidance had an overall average mean total score of 36.73 as compared to an overall average mean total score of 56.86 for those applications focused on improving the administration of vocational education at the State level. The average mean total scores by priority area are presented in Table 6.

Table 6. Number of Applications and Average Mean Total Score by Priority Area

Priority Area	Number of Applications		Average Mean Total Score
Curriculum	66		51.90
Disadvantaged	89		55.81
Guidance	103		36.73
Local Adm.	47		44.80
State Adm.	48		56.86
	353	Overall Mean	48.19

Significant at 0.0001 level

The sixth hypothesis is that there is no difference between average mean total scores assigned to applications that have their pages numbered and those that do not. This null hypothesis was rejected at the .05 alpha level. Applications which had their pages numbered had an overall mean score which was approximately 6 points greater than applications which did not have their pages numbered. Average mean total scores are shown in Table 7.

Table 7. Number of Applications and Average Mean Total Score by Presence of Page Numeration

Presence of Page Numeration	Number of Applications		Average Mean Total Score
Pages not numbered	66		43.16
Pages numbered	287		49.48
	353	Overall Mean	48.19

Significant at 0.0213 level

The seventh hypothesis is that there is no difference between average mean total scores assigned to applications that contain a table of contents and those that do not. This null hypothesis was rejected at the .05 alpha level. Table 8 indicates that there was a mean difference of 10 points be-

Table 8. Number of Applications and Average Mean Total Score by Presence of Table of Contents

Presence of Table of Contents	Number of Applications		Average Mean Total Score
Table of Contents present in application	92		55.81
Table of Contents absent in application	261		45.50
	353	Overall Mean	48.19

Significant at 0.0001 level

tween applications which contained a table of contents and those that did not. Slightly more than one-fourth (26 percent) of the applications had a table of contents to facilitate the reading of the application.

The eighth hypothesis is that there is no difference between average mean total scores assigned to applications that contain an abstract and those that do not. This null hypothesis was rejected at the .05 alpha level. Of the applications which provided an abstract (19 percent), the overall mean average was 9 points higher than applications which did not provide an abstract. The results are presented in Table 9.

Table 9. Number of Applications and Average Mean Total Score by Presence of Abstract

Presence of Abstract	Number of Applications		Average Mean Total Score
Abstract present in application	67		55.28
Abstract not present in application	286		46.53
	353	Overall Mean	48.19

Significant at 0.0015 level

The ninth hypothesis is that there is no difference between average mean total scores assigned to applications that contain a glossary of terms and those that do not. This null hypothesis was rejected at the .05 alpha level. Although only 9 applications (3 percent) provided a glossary of terms, these applications had an overall average mean total score which was 13 points greater than the applications not containing a glossary of terms. Results are presented in Table 10.

Table 10: Number of Applications and Average Mean Total Score by Presence of Glossary of Terms

Presence of Glossary of Terms	Number of Applications		Average Mean Total Score
Glossary of terms present in application	9		60.79
Glossary of terms not present in application	344		47.86
	353	Overall Mean	48.19

Significant at 0.0508 level

The tenth hypothesis is that there is no difference between average mean total scores assigned to applications that contain supporting letters of endorsement and those that do not. This null hypothesis was rejected at the .05 alpha level. Although only 25 percent of the applications contained supporting letters of endorsement, these applica-

tions were rated on the average 8 points higher than the applications not containing such endorsement. Results are presented in Table 11.

Table 11. Number of Applications and Average Mean Total Score by Presence of Supporting Letters of Endorsement

Presence of Supporting Letters of Endorsement	Number of Applications		Average Mean Total Score
Supporting letter(s) of endorsement present in application	89		54.34
Supporting letter(s) of endorsement not present in application	264		46.12
	353	Overall Mean	48.19

Significant at 0.0010 level

The eleventh hypothesis is that there is no difference between average mean total scores assigned to applications containing a literature review and those that do not. This null hypothesis was not rejected at the .05 alpha level. Results are contained in Table 12.

Table 12. Number of Applications and Average Mean Total Score by Presence of Literature Review

Presence of Literature Review	Number of Applications		Average Mean Total Score
Review of literature provided for in application	34		52.35
Review of literature not provided for in application	319		47.75
	353	Overall Mean	48.19

Significant at 0.1969 level

Although the variation in scoring pattern was not statistically significant, it nevertheless is worth noting that of the applications which did provide for such a review of the literature (10 percent) their overall mean score was 5 points greater than for those applications not containing such a review.

The twelfth hypothesis is that there is no difference between average mean total scores assigned to applications containing tables and charts and those that do not. This null hypothesis was rejected at the .05 alpha level. Table 13 indicates that for the 172 applications (49 percent) which had tables and charts, their overall mean score was 9 points greater than the 51 percent which did not provide for tables and charts to explain or support the narrative of the application.

Table 13. Number of Applications and Average Mean Total Score by Presence of Tables and Charts

Presence of Tables and Charts	Number of Applications		Average Mean Total Score
Tables and Charts present in application	172		52.91
Tables and charts not present in application	181		43.78
	353	Overall Mean	48.19

Significant at 0.0001 level

The thirteenth hypothesis is that there is no difference between average mean total scores assigned to applications containing attachments and appendices and those that do not. This null hypothesis was rejected at the .05 alpha level. Table 14 indicates a mean difference of 8 points between applications containing attachments and appendices (49 percent) and those that do not (51 percent).

Table 14. Number of Applications and Average Mean Total Score by Presence of Attachments and Appendices

Availability of Attachments and Appendices in an Application	Number of Applications	Average Mean Total Score
Presence of attachments and appendices in an application	172	52.24
Absence of attachments and appendices in an application	181	44.34
	353	Overall Mean 48.19

Significant at 0.0004 level

The fourteenth hypothesis is that there is no difference between average mean total scores assigned to applications containing enumerated objectives and those that do not. This null hypothesis was rejected at the .05 alpha level. As shown in Table 15, applications which did not enumerate their objectives (20 percent) had an overall mean score which was 10 points less than those (80 percent) which had numbered their objectives.

Table 15. Number of Applications and Average Mean Total Score by Presence of Enumerated Objectives

Presence of Enumerated Objectives	Number of Applications		Average Mean Total Score
Objectives enumerated in application	283		50.09
Objectives not enumerated in application	70		40.50
	353	Overall Mean	48.19

Significant at 0.0001 level

The fifteenth hypothesis is that there is no difference between average mean total scores assigned to applications containing a provision for consultants and those that do not. This null hypothesis was rejected at the .05 alpha level. Applications not containing a line item in the budget for consultants (54 percent) had an overall mean score which was 10 points less than applications (46 percent) which provided for consultants in their budget. Table 16 provides the mean scores of applications when analyzed for this application characteristic.

Table 16. Number of Applications and Average Mean Total Score by Presence of Provision for Consultants in Budget

Budgetary Provision for Consultants in Application	Number of Applications		Average Mean Total Score
Consultants provided for in budget of application	162		53.47
Consultants not provided for in budget of application	191		43.71
	353	Overall Mean	48.19

Significant at 0.0001 level

The sixteenth hypothesis is that there is no difference between average mean total scores assigned to applications containing resumes of consultants and those that do not. This null hypothesis was rejected at the .05 alpha level. Although less than 9 percent of the applications provided resumes on the consultants proposed for use, these applications (28) had an overall mean score of 58.30 which was 11 points greater than the mean score for applications not containing the resumes of the consultants. Results are contained in Table 17.

Table 17. Number of Applications and Average Mean Total Score by Presence of Resumes of Consultants Provided

Provision for Resumes of Consultants	Number of Applications		Average Mean Total Score
Resumes of proposed consultants provided in application	28		58.30
Resumes of proposed consultants not provided in application	325		47.32
	353	Overall Mean	48.19

Significant at 0.0051 level

The seventeenth hypothesis is that there is no difference between average mean total scores assigned to applications containing resumes of the project key staff and those that do not. This null hypothesis was rejected at the .05 alpha level. Applications containing resumes of project key staff (74 percent) had a total mean score 14 points greater than did the applications not containing resumes of the key staff proposed for the project (26 percent). Details on this characteristic are provided in Table 18.

Table 18. Number of Applications and Average Mean Total Score by Presence of Resumes of Project Key Staff

Presence of Resumes for Project Key Staff	Number of Applications		Average Mean Total Score
Resumes of project key staff provided for in application	262		51.74
Resumes of project key staff not provided for in application	91		37.96
	353	Overall Mean	48.19

Significant at 0.0001 level

The eighteenth hypothesis is that there is no difference between average mean total scores assigned to applications containing a project organizational chart and those that do not. This null hypothesis was rejected at the .05 alpha level. Although the vast majority of applications did not provide a project organizational chart (88 percent), when applications did provide such charts (12 percent) it tended to affect their total scores. As shown in Table 19, applications containing such charts had a total mean score 13 points greater than those without charts.

Table 19. Number of Applications and Average Mean Total Score by Presence of Project Organizational Chart

Presence of Project Organizational Chart	Number of Applications		Average Mean Total Score
Project organizational chart provided in application	44		59.01
Project organizational chart not provided in application	309		46.65
	353	Overall Mean	48.19

Significant at 0.0003 level

The nineteenth hypothesis is that there is no difference between average mean total scores assigned to applications containing clearly identified end products and those that do not. This null hypothesis was rejected at the .05 alpha level. When applications were analyzed for this characteristic, slightly more than one-fourth of the applications (27 percent) provided such detail. However, their average mean total score was 12 points greater than the average mean total score for applications not providing for clearly identifiable end products. The results of this analysis are contained in Table 20.

Table 20. Number of Applications and Average Mean Total Score by Presence of Clearly Identified End Products

Clearly Identified End Products	Number of Applications		Average Mean Total Score
End products clearly identified in application	97		56.80
End products not clearly identified in application	256		44.93
	353	Overall Mean	48.19

Significant at 0.0001 level

The twentieth hypothesis is that there is no difference between average mean total scores assigned to applications containing a statement of plan for the evaluation of the project and those that do not. This null hypothesis was rejected at the .05 alpha level. The total mean score for applications containing an evaulation plan (33 percent) was 5 points greater than those (66 percent) without a plan for evaluating the project. Table 21 provides the detail for this characteristic of applications.

Table 21. Number of Applications and Average Mean Total Score by Presence of Provision for Statement of Plan for Project Evaluation

Provision for Statement of Plan for Project Evaluation	Number of Applications		Average Mean Total Score
Statement of plan for project evaluation provided for in application	117		51.14
Statement of plan for project evaluation not provided for in application	236		46.73
	353	Overall Mean	48.19

Significant at 0.0465 level

The twenty-first hypothesis is that there is no difference between average mean total scores assigned to applications in which the project director is identified by name and those that do not. This null hypothesis was rejected at the .05 alpha level. The applications (83 percent) which identified the project director had a total mean score 16 points greater than did the applications not containing such an identification. This significant characteristic is described in Table 22.

Table 22. Number of Applications and Average Mean Total Score by Presence of Identification of Project Director by Name

Identification of Project Director by Name	Number of Applications		Average Mean Total Score
Project director identified by name in application	292		50.96
Project director not identified by name in application	61		34.91
	353	Overall Mean	48.19

Significant at 0.0001 level

The twenty-second hypothesis is that there is no difference between average mean total scores assigned to applications in which references are cited as footnotes and those that do not. This null hypothesis was rejected at the .05 alpha level. Applications which did not provide such citations (63 percent) had a total mean score which was 7 points lower than applications containing footnote citations. Table 23 provides the details on the average mean total scores for this characteristic.

Rable 23. Number of Applications and Average Mean Total Score by Presence of References Cited as Footnotes

References Cited as Footnotes	Number of Applications		Average Mean Total Score
References cited as footnotes in application	131		52.35
References not cited as footnotes in application	222		45.73
	353	Overall Mean	48.19

Significant at 0.0028 level

The twenty-third hypothesis is that there is no linear relationship between application characteristics and average mean total score. For purposes of analysis, thirty-one (31) applicant characteristics were selected for inclusion in the linear regression model. Forward step-wise regression procedures were used to identify those characteristics that made a significant contribution to prediction of average mean total score. The results are presented in Table 24. Of the thirty-one (31) characteristics, only fifteen (15) were found to make a significant contribution. Characteristics that do not make a significant contribution are shown in Table 24 with a zero (0) beta weight. The fifteen significant variables retained in the reduced linear model accounted for 46 percent of the variation of the dependent variable. This is equivalent to a multiple correlation of $R = .68$ which is significant at the .0001 level.

Table 24. Results of the Forward Stepwise Elimination Procedure

Variable Name	Beta Value**
R^2 = .463	
Intercept 24.46	
Pages numbered	
Yes	0
No	*
Table of contents	
Yes	0
No	*
Abstract	
Yes	0
No	*
Glossary of terms	
Yes	0
No	*
Supporting letter of endorsement	
Yes	4.80
No	*
Literature review	
Yes	0
No	*
Table or charts	
Yes	0
No	*
Attachments or appendices	
Yes	0
No	*
Enumerated objectives	
Yes	5.00
No	*

Table 24. Results of the Forward Stepwise Elimination Procedure (continued)

Variable Name	Beta Value**
Consultants provided for in budget	
Yes	4.42
No	*
Resume of consultants provided	
Yes	0
No	*
Resume of project key staff provided	
Yes	0
No	*
Project organization chart	
Yes	5.93
No	*
End products of project clearly identified	
Yes	0
No	*
Statement of plan for project evaluation provided	
Yes	0
No	*
Project director identified by name	
Yes	7.26
No	*
References or sources cited as footnotes	
Yes	0
No	*
Number of pages devoted to Results/ Expected Benefits	2.28

Table 24. Results of the Forward Stepwise Elimination Procedure (continued)

Variable Name	Beta Value**
Number of pages devoted to Objectives/ Need for Assistance	.43
Number of pages devoted to Approach	.16
Duration	0
Federal dollars requested	0
Priority area	
Curriculum	*
Guidance	-15.55
Local administration	- 6.80
State administration	0
Disadvantaged and handicapped	4.53
Institutions	
Local educational agency	*
State educational agency	11.71
Junior/community college	5.42
4 year college/university	7.53
Profit organization	0
Non-profit organization	7.71
Post secondary non-Jr/community college	0

* Base class
** All beta weights were significant at the .10 level

The results presented in Table 24 clearly indicate that the significant factors related to application ratings are (1) the priority area in which submitted, (2) type of institution applying, (3) characteristics descriptive of the application per se. Applications submitted in the guidance area received 15.5 points less than those submitted in the curriculum area, whereas those submitted in the disadvantaged area received 4.5 more when the effects of all other factors were held constant. With respect to agency submitting, state agencies received a 11.7 point advantage over local education agencies; junior and community colleges a 5.4 point advantage; 4 year colleges and universities, a 7.53 differential, and not-for-profits, a 7.71 advantage. With regard to characteristics pertaining to the application per se, a letter of endorsement was worth 4.8 points; enumerated objectives, 5.0 points; identification of consultants, 4.4 points; organizational chart, 5.9 points; identification of project director, 7.3 points; pages devoted to need were worth .43 points per page; pages devoted to expected results/benefits were worth 2.3 points per page; and pages devoted to approach were worth .16 points per page.

Chapter 5

SUMMARY AND CONCLUSIONS

SUMMARY

The purpose of this chapter is to present a summary and recommendations based on the results of the data analyses in terms of the purpose of the study. As stated in Chapter 1, the purpose of this study was to identify those characteristics of research applications that are related to judged quality as determined by a panel of raters. Twenty-three hypotheses were formulated concerning potential characteristics which might influence ratings of applications. Chapter 2 reviewed previous research results. No studies were uncovered that dealt directly with the proposed problem. Chapter 3 basically defined the methodology applied to obtain and analyze data so as to test the hypotheses. Chapter 4 presented the results of statistical tests of the twenty-three hypotheses.

Statistically significant differences were found in the ratings of applications which had the following characteristics as compared to those that did not:

(1) Pages numbered

(2) Table of contents

(3) Abstract

(4) Glossary of terms

(5) Supporting letters of endorsement

(6) Tables and charts

(7) Attachments or appendices

(8) Enumerated objectives

(9) Provision in the budget for consultants

(10) Resumes of consultants

(11) Resumes of key project staff

(12) Project organizational chart

(13) End-products of project clearly identified

(14) Statement of plan for project evaluation

(15) Project director identified by name

(16) References or sources cited as footnotes

In addition, there was a significant difference in the ratings according to type of institution submitting applications, the priority area addressed by the applicant, and the planned duration of the proposed project effort.

There was no significant difference between applications when analyzed by State of origin, Federal region, or the presence in the application of a literature review.

When a forward elimination procedure was used to determine the independent contribution of characteristics associated with judged quality the following characteristics emerged:

(1) Selection of the guidance priority area

(2) Identification of the project director by name

(3) Number of pages devoted to the objectives and need statement

(4) Addressment of the priority focused on improving the administration of vocational education at the local level

(5) Submission of an application by a State Department of Education

(6) Supporting letters of endorsement

(7) Consultants provided for in the budget

(8) Enumerated objectives

(9) Submission of an application by a 4-year college or university

(10) Submission of an application by a non-profit organization

(11) Number of pages devoted to discussing the approach to be used in achieving the objectives of the project

(12) Presence of an organizational chart in the application

(13) Submission of an application in the priority area focused on the disadvantaged

CONCLUSIONS

The results as summarized do not clearly prescribe a course of action for the Federal government nor for applicants seeking a Federal grant. The study, however, does demonstrate that certain application characteristics are associated with evaluator ratings. What is clearly documented is that certain factors beyond the control of the applicant a priori have major effects.

Priority choice and applicant type play a dominating role in the rating process. Because of the exploratory

nature of this study and the methods which were of necessity applied, it is not possible to determine absolutely whether the applications from applicants in the Guidance Priority area were poorer in quality or whether the evaluators simply gave lower ratings or whether by its very nature, guidance is a more difficult area in which to carry out research. Likewise, the lower ratings given local education agencies in comparison to other groups may reflect poorer quality applications or evaluator prejudice against such institutions. Certainly it is possible empirically to investigate these phenomena and such a study should be undertaken.

In the interim, it is essential to standardize evaluator ratings so that absolute values awarded by the evaluators are not compared on an absolute basis. Further, more detailed guidelines should be developed and training seminars provided to assure that local education agencies are able to prepare more competitive applications.

Regardless of the aforementioned concerns, it is felt that many essential characteristics have been identified which contribute to the evaluation of research proposals. It is hoped that the results of this study ultimately will contribute to improved quality of Federally funded research. Although important as a preliminary effort, further research is needed to substantiate the tentative hypotheses herein established.

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APPENDICES

APPENDIX B

Panel Composition by Priority Area

Administration of Vocational Education at the State Level - Panel

Chairperson: Acting Director
Division of Vocational and Technical Education
Bureau of Occupational and Adult Education
U.S. Office of Education
Washington, D.C.

Executive Secretary : Program Officer
Research Branch
Division of Research and Demonstration
Bureau of Occupational and Adult Education
U.S. Office of Education
Washington, D.C.

Panel Members : Director
Bureau of Special and Compensatory Education
Pennsylvania State Department of Education
Harrisburg, Pennsylvania

Research Associate
Productivity and Technology Group
National Institute of Education
Washington, D.C.

Director
Vocational Education
Oklahoma State Department of Education
Stillwater, Oklahoma

Director
Program Services Branch
Division of Vocational Education
Alabama State Department of Education
Montgomery, Alabama

Senior Program Officer, Region IX
Occupational and Adult Education
U.S. Office of Education
San Francisco, California

Economist
Bureau of Labor Statistics
U.S. Department of Labor
Washington, D.C.

Administration of Vocational Education at the Local Level - Panel

Chairperson: Chief
Bilingual and Indian Education Programs
Division of Educational Systems Development
Bureau of Occupational and Adult Education
U.S. Office of Education
Washington, D.C.

Executive Secretary : Program Officer
Research Branch
Division of Research and Demonstration
Bureau of Occupational and Adult Education,
U.S. Office of Education
Washington, D.C.

Panel Members : Director
Instructional Systems
The School District of Philadelphia
Philadelphia, Pennsylvania

Chief
Research, Planning, and Evaluation Branch
National Institute of Education
Washington, D.C.

Program Manager
Office of Indian Education
U.S. Office of Education
Washington, D.C.

Director
Vocational-Technical and Industrial Education
Minneapolis Public Schools
Minneapolis, Minnesota

Chief
Program Support Branch
Division of Vocational and Technical Education
Bureau of Occupational and Adult Education
U.S. Office of Education
Washington, D.C.

Comprehensive Systems of Guidance, Counseling, Placement and Follow-Through Services - Panel

Chairperson: Specialist
Division of Adult Education
Bureau of Occupational and Adult Education
U.S. Office of Education
Washington, D.C.

Executive Secretary : Program Officer
Research Branch
Division of Research and Demonstration
Bureau of Occupational and Adult Education
U.S. Office of Education
Washington, D.C.

Panel Members : Manpower Development Specialist
U.S. Department of Labor
Washington, D.C.

Social Science Instructor
Foothill Community College
Los Altos Hills, California

Director
Pupil Personnel Services Section
Minnesota Department of Education
St. Paul, Minnesota

Education Program Specialist
Bureau of School Systems
U.S. Office of Education
Washington, D.C.

Director
Research Coordinating Unit
University of Maine
Orono, Maine

Educational Personnel Serving the Disadvantaged, Handicapped, and Minorities - Panel

Chairperson: Senior Program Specialist
Division of Adult Education
Bureau of Occupational and Adult Education
U.S. Office of Education
Washington, D.C.

Executive Secretary: Program Officer
Research Branch
Division of Research and Demonstration
Bureau of Occupational and Adult Education
U.S. Office of Education
Washington, D.C.

Panel Members: Director
Indian Careers on Health
University of Montana
Missoula, Montana

Instructor
Mesa Community College
Mesa, Arizona

Program Specialist
Division of Vocational and Technical Education
Bureau of Occupational and Adult Education
U.S. Office of Education
Washington, D.C.

Associate Dean
Graduate Studies and Research
College of Education
Florida State University
Tallahassee, Florida

Program Specialist
Division of Vocational and Technical Education
Bureau of Occupational and Adult Education
U.S. Office of Education
Washington, D.C.

Curriculum, Demonstration, and Installation Studies - Panel

Chairperson: Education Specialist
Division of Vocational and Technical Education
Bureau of Occupational and Adult Education
U.S. Office of Education
Washington, D.C.

Executive Secretary : Program Officer
Research Branch
Division of Research and Demonstration
Bureau of Occupational and Adult Education
U.S. Office of Education
Washington, D.C.

Panel Members : Vice President
Prince Georges Community College
Largo, Maryland

Senior Advisor to the Deputy Commissioner
for Occupational and Adult Education
Division of Occupational Planning
Bureau of Occupational and Adult Education
U.S. Office of Education
Washington, D.C.

Program Officer, Region VI
Occupational and Adult Education
U.S. Office of Education
Dallas, Texas

Dean of Instructional Development
El Paso Community College
El Paso, Texas

Program Specialist
Division of Vocational and Technical Education
Bureau of Occupational and Adult Education
U.S. Office of Education
Washington, D.C.

Director
Human Resources Development Program
Flathead Education Department
Dixon, Montana

APPENDIX C

Data Recording Form

Keypunch Format

FY 1975 Vocational Education Research Applications

1. Application No. _____ 4. Priority Area _____

2. State _____ 5. Duration in months _____

3. Federal region _____ _____

6. Type of Institution:

( ) LEA ( ) Jr./comm.coll. ( ) Profit organ.
( ) SEA ( ) 4-yr coll./univ. ( ) Non-profit organ.
( ) Postsecondary, non-jr./comm.coll.

7. Application Evaluation Criteria:

Evaluator	#___	#___	#___	#___	#___	#___	
Addressed priority area	___	___	___	___	___	___	
Need & problem	___	___	___	___	___	___	
Objectives	___	___	___	___	___	___	
Plan	___	___	___	___	___	___	
Results	___	___	___	___	___	___	
Personnel	___	___	___	___	___	___	
Institutional commitment	___	___	___	___	___	___	
Budget	___	___	___	___	___	___	
Total Score	___	___	___	___	___	___	___ Average

8. ____ Number of pages devoted to Objectives & Need for this Assistance

9. ____ Number of pages devoted to Results or Benefits Expected

10. ____ Number of pages devoted to Approach

( ) Pages numbered
( ) Table of contents
( ) Abstract
( ) Glossary of terms

10. (continued)

( ) Supporting letters of endorsement
( ) Literature review
( ) Tables or charts
( ) Attachments or appendices
( ) Enumerated objectives
( ) Consultants provided for in budget
( ) Resumes of consultants provided
( ) Resumes of project key staff provided
( ) Project organizational chart
( ) End products of project clearly identified
( ) Statement of plan for project evaluation provided
( ) Project director identified by name
( ) Application stapled or securely bound
( ) References or sources cited as footnotes

KEYPUNCH DOCUMENTATION

FY 1975 VOCATIONAL EDUCATION RESEARCH APPLICATIONS

No.	Column Number	Variable Definitions
1	1-5	Refers to the last five digits of the Application Control Number.
2	6-7	Refers to the State in which the applicant resides.
3	8-9	Refers to the Department of Health, Education, and Welfare's Regional Office designation for the State of the applicant.
4	10	Refers to the priority area, i.e., S = State Adm. of Voc. Ed. L = Local Adm. of Voc. Ed. C = Curriculum D = Disadvantaged G = Guidance
5	11-12	Refers to the proposed length of the application, i.e., its duration.
6	13	Refers to type of institution submitting application, i.e., LEA = Local Education Agency SEA = State Department of Education The remaining types of institutions are clearly identified.
7	26-62	Refers to the evaluator. Each evaluator was assigned a two-digit code.
8	14-16	Refers to the number of pages devoted to the statement of the problem or need for the research, the review of the literature, and the objectives.

(continued)

No.	Column Number	Variable Definitions
9	17-19	Refers to the number of pages devoted to results or benefits to be expected from the project.
10	20-22	Refers to the approach or procedures to be used in achieving the objectives and includes personnel and their vitae, etc.